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14. ABSTRACT
Sensible weather occurs on small scales and the development and evolution of these small scale features depends strongly on the larger scale environment. Synoptic scale variability is represented by the individual members in a well-designed ensemble modeling system. The objective of this research is to quantify the local scale variations in sensible weather elements, like fog, due to larger scale variability. The sensitivity of selected weather elements to synoptic scale background variance will be quantified to identify when local scale predictability may be high or low.

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Quantifying Sensible Weather Forecast Variability

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LONG-TERM GOALS

The long-term goal of this research is to examine the tactical scale environmental predictability and provide a methodology by which it may be operationally assessed or monitored.

OBJECTIVES

Sensible weather occurs on small scales and the development and evolution of these small scale features depends strongly on the larger scale environment. Synoptic scale variability is represented by the individual members in a well-designed ensemble modeling system. The objective of this research is to quantify the local scale variations in sensible weather elements, like fog, due to larger scale variability. The sensitivity of selected weather elements to synoptic scale background variance will be quantified to identify when local scale predictability may be high or low.

APPROACH

The basic approach that will be used to investigate the tactical-scale sensible weather forecast sensitivity is to conduct a variety of numerical model experiments. The time range of interest is the 0-48h forecast of sensible weather elements of operational interest.

Sensible weather elements are generally not explicitly forecast by numerical models but will be derived algorithmically using appropriate combinations of explicitly forecast variables. These algorithms will be applied across a set of ensemble forecasts to determine the ensemble-based probability of occurrence for a particular weather element.. The NCEP GFS-based ensemble will provide basis for generating probabilistic forecasts of a variety of sensible weather elements in the 0-48 h time period. Deterministic mesoscale forecasts for the region are available from a 3km resolution forecast from COAMPS and will be used to derive mesoscale sensible weather forecasts that are tuned to this model. Additional COAMPS model runs will be conducted using the NCEP ensemble members to initiate COAMPS forecasts to produce a mesoscale ensemble based on the predicted synoptic scale variance. Since the NCEP ensemble represents synoptic variability, the mesoscale forecasts will vary due only to the local forcing differences that arise from slightly different synoptic conditions. These experiments will be used to systematically test the mesoscale variance that is likely to be driven by larger scale processes.

WORK COMPLETED

Work completed in the initial six months of this project consists of setting up COAMPS for the Monterey Bay region of study, developing the method by which NCEP ensemble forecasts can be used to initialize COAMPS, and examining the algorithms that will be applied to model forecasts to derive sensible weather elements. The COAMPS model was ported to our super-computing cluster to begin this study. NCEP ensemble model fields are being routinely downloaded at NPS. The software to bring these into COAMPS is still under development but should be operating very soon. Testing has begun on marine stratus/fog algorithms to apply to model outout.

RESULTS

There are no real results to report at this early stage of research.

IMPACT/APPLICATIONS

Potential impacts of this research are postprocessing tools that can be applied to COAMPS forecasts to alert forecasters to periods of high sensitivty in specific sensible weather parameters.

RELATED PROJECTS

None.